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| 10/664,890      | 09/22/2003  | Hajime Harashima     | Q77475              | 4268             |

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| EXAMINER |
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KRAVETS, LEONID

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 2189     |              |

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/664,890

Applicant(s)

HARASHIMA, HAJIME

Examiner

Leonid Kravets

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action has been issued in response to amendment filed 6 February 2006. Claims 1-19 are pending. Applicant's arguments have been carefully and fully considered in light of the instant amendment, but they are not persuasive. Accordingly this action has been made **FINAL**.

### ***Drawings***

2. The previous objection to the drawings is withdrawn due to amendment filed 6 February 2006.

### ***Claim Objections***

3. The previous objection to claim 10 is withdrawn due to clarification in amendment filed 6 February 2006.

4. The amended claim 12 recites the limitation "writing data in said second storage means data as instructed by a processor". The second data should be deleted.

***Claim Rejections - 35 USC § 112***

5. The previous rejection under 35 USC 112, first paragraph, is withdrawn due to amendment filed 6 February 2006.
6. The previous rejection under 35 U.S.C. 112, second paragraph, is withdrawn due to amendment filed 6 February 2006.
7. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. Claim 12 recites the limitation "said second storage means" in line 5 of the claim. There is insufficient antecedent basis for this limitation in the claim. Examiner interprets the limitation as "a second storage means"

***Claim Rejections - 35 USC § 102***

9. Claims 1-2, 4-5, 12-13 15-16 and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kalman (US Patent 6,820,211).

Art Unit: 2189

10. As per claim 1, Kalman discloses a data writing apparatus for writing data into storage means (Col 1, Lines 63-66), comprising:

~~an upper-rank~~ a processor unit (Fig 1, Ref 12);

a first storage means, ~~where data to be written~~, wherein said first storage has a redundancy structure [RAID provides parity bits and striping, giving a redundancy structure (Fig 1, Ref 23; Col 4, Lines 22-26)]; and

a control unit which writes data in said first storage means in response to a command from said ~~upper-rank~~ processor unit (Fig 1, Ref 22)

wherein the control unit ~~and includes a second storage means~~,

~~second storage means~~ (Fig 2, Ref 108), and

a logical disk [RAID is a logical disk] writing/reading means for writing data in said second storage means ~~data writing of which~~ when ~~at an address in said first storage means~~ is instructed by said ~~upper-rank~~ processor unit (Fig 3A, Ref 216, 218) and reporting completion of writing to said ~~upper-rank~~ processor unit [the wait of Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on another storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the processor instructs the writing of data and the control unit writes the data in said second storage means when a redundancy destruction occurs in said first storage unit (Fig 3A, Ref 204), the data written to said second storage unit at said corresponding to an address of the redundancy destruction of said first storage means [The data is written to said second storage unit corresponding to an address of the redundancy destruction of said first storage means since the data must placed in such a way that it can be written back

from the NVRAM into the storage medium so that the storage medium can come back online (Fig 3A, Ref 222)].

11. As per claim 2, Kalman discloses the data writing apparatus according to claim 1, wherein said control unit (Col 3, Lines 57-61) further comprises a logical disk [RAID] monitoring means which verifies if said redundancy destruction at said corresponding address of said first storage means has been recovered (Fig 3A, Ref 220), and  
when said logical disk monitoring means verifies that said redundancy ~~destruction at said~~ corresponding address of said first storage means has been recovered, said logical disk writing/reading means reads data written in said second storage means and writes said data at said corresponding address in said first storage means (Fig 3A, Ref 222).

12. As per claim 4, Kalman discloses the data writing apparatus according to claim 1, wherein said second storage means is a non-volatile storage means or a volatile storage means ~~having~~ which has an independent power supply (Col 3, Lines 42-49).

13. As per claim 5, Kalman discloses the data writing apparatus according to claim 1, wherein said second storage means retains data written in said second storage means, by said control unit until said data is written in said first storage means [In order to update the drive, data must be stored until it is written in first storage means (Fig 3A, Ref 222)].

14. As per claim 11, Kalman discloses a data writing apparatus for writing data into storage means, comprising:

processor;

a first storage means, comprising redundancy structure wherein data and redundant data are written when instructed by a processor [RAID device, storing data and redundant data as parity bits (Fig 1, Ref 23), if data of a size equal to or smaller than a size of said redundant data is destroyed, said first storage means ensuring data by repairing said data from remaining data (Fig 3A, Ref 222);

a control unit which writes data in said first storage means in response to a command from said processor (Fig 1, Ref 22) and includes

a second storage means (Fig 2, Ref 108), and

a logical disk [RAID is a logical disk] writing/reading means for writing data in said second storage means when instructed by said processor unit processor unit (Fig 3A, Ref 216, 218) and reporting completion of writing to said processor unit [the wait of Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on another storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the processor instructs the writing of data and the control unit writes the data in said second storage means when a redundancy destruction occurs in said first storage unit (Fig 3A, Ref 204), the data written to said second storage unit corresponding to an address of the redundancy destruction of said first storage means [The data is written to said second storage unit corresponding to an address of the redundancy destruction of said

Art Unit: 2189

first storage means since the data must be placed in such a way that it can be written back from the NVRAM into the storage medium so that the storage medium can come back online (Fig 3A, Ref 222)].

15. As per claim 12, Kalman discloses a method for writing data into storage means where data to be written has a redundancy structure (Col 1, Line 63 – Col 2, Line 1), comprising the steps of:

A) when a redundancy destruction occurs at an address in ~~said a~~ first storage means, wherein the first storage means where data to be written has a redundancy structure [The redundancy structure is the parity bits provided by the RAID system (Fig 3A, Ref 204, 212)], writing data in said second storage means data writing of which at said address is as instructed by an upper rank unit a processor, said data corresponding to an address of redundancy destruction in said first storage means [The data request given by the processor can not be written to the first storage means, thus it is forwarded to a second storage means as described, the address corresponds to an address in the first storage means since it must later be written into the first storage means (Fig 3A, Ref 216, 218 and 222)]; and



B) reporting completion of writing data in said second storage means to ~~said upper-rank-unitprocessor~~ [the wait of Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on another storage medium (Fig 3A, Ref 218) is an indicator of completion].

16. As per claim 13, Kalman discloses the method according to claim 12, further comprising the steps of:

C) verifying if ~~said-redundancy destruction~~ at said address of said redundancy destruction of said first storage means has been recovered (Fig 3a, Ref 220);

D) when recovery of said redundancy ~~destruction~~ is verified, reading data written in said second storage means (Fig 3A, Ref 222); and

E) writing said data at said address in said first storage means (Fig 3A, Ref 222).

17. As per claim 15, Kalman discloses a method for writing and reading data into and from storage means where data to be written has a redundancy structure (Col 1, Line 63 – Col 2, Line 1), comprising the steps of:

JA) when a redundancy destruction occurs at an address in ~~said-a~~ first storage means, writing data in ~~said-a~~ second storage means ~~data-writing-of-which-at said-address-is~~ as instructed by an ~~upper-rank-unitprocessor~~ (Fig 3a, Ref 216, 218);

~~KB)~~ reporting completion of writing said data in said second storage  
means to said upper-rank-unitprocessor [the wait of Kalman for the next data request  
(Fig 3A, Ref 208) after storing data from request on another storage medium (Fig 3A,  
Ref 218) is an indicator of completion];

~~LC)~~ when there is data-reading data of which from said address  
is corresponding to a redundancy destruction in the first storage means as instructed  
by said upper-rank-unitprocessor; ~~reading said data from said second storage means.~~  
(Fig 3A, Ref 210, 212)

18. As per claim 16, Kalman discloses the method according to claim 15, further comprising the steps of:

~~MD)~~ when recovery of said redundancy destruction is verified, reading the data  
written in said second storage means and writing said data at said address in said first  
storage means (Fig 3A, Ref 222).

19. As per claim 18, Kalman discloses a computer program capable of running on a computer so that the computer performs said steps of claim 12 [a computer program running on a computer is inherent in controlling a controller performing the steps of claim 12].

20. As per claim 19, please see rejection of claim 1 above.

***Claim Rejections - 35 USC § 103***

14. Claims 6-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalman, and further in view of Kakuta (US Patent 5,600,783).

As per claim 6, Kalman discloses a data writing/reading apparatus for writing data into storage means (Col 1, Lines 63-66), comprising:

~~an upper-rank unit~~ processor (Fig 1, Ref 12);

a first storage means where data to be written~~which~~ has a redundancy structure [Raid provides parity bits and striping, thus giving a redundancy structure (Fig 1, Ref 23, Col 4, Lines 22-26)]; and

a control unit which writes data in said first storage means in response to a command from said ~~upper-rank unit~~ processor (Fig 1, Ref 22) and includes

a second storage means (Fig 2, Ref 108), and

a logical disk [RAID is a logical disk] writing/reading means for writing data in said second storage means ~~data writing of which at an address in said first storage means~~when is instructed by said ~~upper-rank~~ processor unit (Fig 3A, Ref 216, 218) and reporting completion of writing to said ~~upper-rank~~ processor unit [the wait of Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on another

Art Unit: 2189

storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the processor instructs the writing of data and the control unit writes the data in said second storage means when a redundancy destruction occurs in said first storage unit (Fig 3A, Ref 204), the data written to said second storage unit at said ~~corresponding to an address of~~ the redundancy destruction of said first storage means [The data is written to said second storage unit corresponding to an address of the redundancy destruction of said first storage means since the data must placed in such a way that it can be written back from the NVRAM into the storage medium so that the storage medium can come back online (Fig 3A, Ref 222)]. Kalman does not disclose reading the data from said second storage means ~~data for which~~ when a command to read is received from ~~said address is~~ given from said upper rank unit processor ~~when that data exists~~.

Kakuta discloses reading the data from said second storage means when a command to read is received from said processor. (Col 11, Lines 17-20).

As per claim 7, Kalman discloses the data writing apparatus according to claim 6, wherein said control unit (Col 3, Lines 57-61) further comprises a logical disk [RAID] monitoring means which verifies if said redundancy ~~destruction~~ at said address has been recovered (Fig 3A, Ref 220), and

when said logical disk monitoring means verifies that said redundancy ~~destruction~~ at said address has been recovered, said logical disk writing/reading

Art Unit: 2189

means reads data written in said second storage means and writes said data at said address in said first storage means (Fig 3A, Ref 222).

As per claim 9, Kalman discloses the data writing apparatus according to claim 6, wherein said second storage means is a non-volatile storage means or volatile storage means having which has an independent power supply (Col 3, Lines 42-49).

As per claim 10, Kalman discloses the data writing apparatus according to claim 6, wherein said second storage means retains data, which was written in the second storage means by said control unit, until said data is subsequently read from the second storage means by said control unit. [In order to update the drive, data must be stored until it is written in first storage means (Fig 3A, Ref 222)].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate reading data from the second storage device of Kakuta into the system of Kalman, since Kalman and Kakuta form the same field of endeavor, namely data requests in a faulty storage array and this would allow for faster access to newly written data (Col 11, Lines 20-21).

15. Claims 3, 8, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalman as applied to claims 1 6, 12 and 15 above, and further in view of applicant's description of prior art.

As per claim 3, Kalman discloses the data writing apparatus according to claim 2. Kalman does not disclose the apparatus wherein said logical disk monitoring means comprises:

The applicant's specification disclosure of conventional data writing apparatus discloses the management table updating means which checks a status of said first storage means and updates a management table (Page 2, lines 4-8);

Further the applicant's disclosure of conventional data writing apparatus discloses a timer which informs said management table updating means of ~~passage of~~ a lapse of a given time when elapsed period (Page 2, lines 1-3); and

The applicant's specification disclosure of conventional data writing apparatus does not disclose write-enableness reporting means which reports recovery of said redundancy destruction at said corresponding address of said first storage means to said logical disk writing/reading means when said management table indicates said recovery of said redundancy destruction.

Kalman discloses write-enableness reporting means which reports recovery of said redundancy destruction at said corresponding address of said first storage means to said logical disk writing/reading means (Fig3A, Ref 220) when said management table indicates said recovery of said redundancy destruction [since applicant discloses management table checking status of first storage means, it would have been obvious to one having ordinary skill in the art at the time the invention was

Art Unit: 2189

made to use the result of this check to decide when the recovery of redundancy destruction is complete].

As per claim 8, please see rejection of claim 3 above. Claim 8 is rejected for similar reasons.

As per claim 14, Kalman discloses the method according to claim 12,

Kalman does not disclose the method further comprising the steps of:

FC) checking a status of said first storage means when a given time elapses;

GD) updating a management table;

The applicant's description of a conventional data writing apparatus discloses the steps of:

FC) checking a status of said first storage means when a given time elapses (Page 2, Lines 3-8);

GD) updating a management table [it is obvious that the management table updating means updates a management table];

Kalman further discloses the steps of:

HE) reading data written in said second storage means when said management table indicates recovery of said redundancy-destruction [since applicant discloses management table checking status of first storage means, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use

Art Unit: 2189

the result of this check to decide when the recovery of redundancy destruction is complete (Col 4, Lines 47-52)]; and

1[E) writing said data at said address in said first storage means (Col 4, Lines 47-52).

As per claim 17, please see rejection of claim 14 above. Claim 17 is rejected for similar reasons.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the management table updating means and timer of applicant's disclosure of prior art into the system of Kalman, since Kalman and applicant form the same field of endeavor, namely data accesses in disc array and applicant describes a conventional data writing apparatus, thus the system of Kalman would have had such a structure for consistent updates of management table.

### ***Response to Arguments***

21. In regard to applicant's argument under section D, claim 1, stating that "Kalman teaches that there is no built in redundancy in a preferred first embodiment" relied on for the rejection of the claim. Examiner asserts that though the abstract states there is no built-in redundancy, a redundancy structure is provided in the first embodiment by the RAID structure which provides parity and striping, allowing for rebuilding of a storage device as shown in Figure 3A, Ref 222. Applicant further states that because there is no



Art Unit: 2189

redundancy structure in a preferred first embodiment, Kalman fails to disclose reporting the completion of writing data in a second storage means. Examiner does not agree, applicant's claims do not state that the redundancy structure is the second storage means. In order for the applicant's arguments to hold, the second structure must be the redundancy structure, a feature that is not claimed.

22. Analogous reasoning is applied in claims 1, 6 12 and 15.

### ***Conclusion***

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Kravets whose telephone number is 571-272-2706. The examiner can normally be reached on Mon-Fri 8-430.

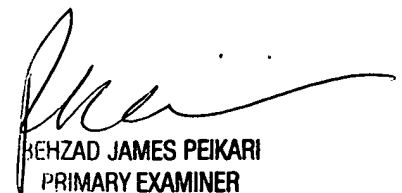
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached at 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leonid Kravets  
Patent Examiner  
Art Unit 2189

February 17, 2006



BEHZAD JAMES PEIKARI  
PRIMARY EXAMINER